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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/583,775

04/23/2009

Wataru Kurokawa

KUROKAWA 1

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EXAMINER

LEADER, WILLIAM T

ART UNIT

PAPER NUMBER

1723

MAIL DATE

DELIVERY MODE

09/30/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/583,775	Applicant(s) KUROKAWA ET AL.	
	Examiner WILLIAM LEADER	Art Unit 1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-13 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-13 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/21/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. This application is a national stage entry of PCT/Jp2004/16565. Receipt is acknowledged of certified copies of foreign priority applications Jp 2003-432983 and Jp 2004-314500 submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. The term "fine" in claim 4 is a relative term which renders the claim indefinite. The term "fine" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 2 re rejected under 35 U.S.C. 102(b) as being anticipated by Heimann et al (US publication 2002/0054998).

6. The Heimann et al publication (hereinafter Heimann) is directed to a process for forming a silicate coating upon a metallic or conductive surface (Abstract). A silicate coating is an oxide coating. A basic apparatus for carrying out the invention is shown in figure 1. The apparatus includes two plates immersed in an electrolyte solution, one plate being connected to the positive terminal of a power supply and serving as the anode, the other being connected to the negative terminal of a power supply and serving as the cathode. In one aspect of the invention, a zinc surface is coated electrolytically with a mineral coating containing silicates (oxides) by being placed into an aqueous sodium silicate solution and applying a constant voltage of 12 volts (direct current) with the workpiece as the cathode. See paragraph [0032]. This corresponds to applicant's recitation of applying a direct current voltage between an anode and a cathode formed of a metal plate positioned opposite the anode in an electrolyte. Heimann also discloses that the amount of oxygen present during formation of the mineral layer can be increased by physically introducing such gas by bubbling. See paragraph [0041], last sentence. This corresponds to applicant's recitation of supplying gas into the electrolyte. All limitations of applicant's claim 1 are taught by Heimann.

7. With respect to claim 2, as noted above, Heimann discloses the introduction of oxygen.

8. Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Harvey et al (US patent 3,928,152).

The Harvey patent is directed to an electrodeposition method. As shown in figures 9 and 10, anodes 30 are provided on both sides of cathode plates 22. The anodes and cathode plates of Harvey correspond to the anode and cathode plate recited in applicant's claims 1 and 7. As

shown in figure 9, the anodes and cathodes are immersed in an electrolyte. In operation a steady voltage (direct current voltage) is applied to between the anodes and cathodes. See tables I and II. As additionally shown in figures 9 and 10, bubble tubes 52 are provided below the space between the anodes and cathodes. The bubble tubes are part of a gas agitation convection system that provides a fluidized sheet of small, rapidly ascending gas bubbles that result in vigorous mixing at the cathode surface, and insures optimum deposition conditions. See column 6, lines 21-68. Thus, Harvey teaches supplying gas into the electrolyte as recited in instant claim 1 and bubble generating means for supplying gas into the electrolyte as recited in instant claim 6. All limitations of claims 1 and 7 are taught by Harvey.

The claim limitation “bubble generating means for supplying gas into the electrolyte” recited in claim 6 uses the phrase “means for” or “step for” or a non-structural term coupled with functional language, but it is modified by some structure, material, or acts recited in the claim. It is unclear whether the recited structure, material, or acts are sufficient for performing the claimed function because the claims recites that the act of generating bubbles. Claim 6 has not been interpreted as invoking 35 U.S.C. 112, sixth paragraph.

If applicant wishes to have the claim limitation treated under 35 U.S.C. 112, sixth paragraph, applicant may amend the claim so that the phrase “means for” or “step for” or the non-structural term is clearly **not** modified by sufficient structure, material, or acts for performing the claimed function, or present a sufficient showing that the claim limitation is written as a function to be performed and the claim does **not** recite sufficient structure, material, or acts for performing the claimed function.

If applicant does **not** wish to have the claim limitation treated under 35 U.S.C. 112, sixth paragraph, applicant may amend the claim so that it will clearly not invoke 35 U.S.C. 112, sixth paragraph, or present a sufficient showing that the claim recites sufficient structure, material, or acts for performing the claimed function to preclude application of 35 U.S.C. 112, sixth paragraph.

9. With respect to claim 2, Harvey discloses that the gas supplied to the electrolyte is air. See, for example, column 6, line 61.

10. With respect to claim 3, as noted above, tubes 52 of Harvey are situated below the space between the anodes and cathodes.

11. With respect to claim 4, the gas is supplied as small bubbles. See, for example, column 6, lines 29 and 59. The limitation “fine” in claim 4 is interpreted as meaning “small”.

12. With respect to claim 5, as noted above, the gas is supplied to contact the cathode surface.

13. With respect to claim 7, Harvey discloses that insoluble anodes may be used. See column 4, lines 66-68.

14. With respect to claim 8, tubes 52 of Harvey are adapted to supply oxygen or a gas containing oxygen. In operation of the apparatus, as noted above, Harvey discloses that air is a gas that may be used.

15. With respect to claim 9, as noted above, tubes 52 of Harvey are situated below the space between the anodes and cathodes.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 3-5 rejected under 35 U.S.C. 103(a) as being unpatentable over Heimann et al (US publication 2002/0054998) in view of Harvey et al (US patent 3,928,152).

18. Heimann and Harvey are interpreted and applied as above. Claim 3 differs from the process of Heimann by reciting that the bubble generating means are situated below or beside the space between the anode and cathode. As shown in figure 9 of Harvey, bubble tubes 52 are provided below the space between the anodes and cathodes. The bubble tubes are part of a gas agitation convection system that provides a fluidized sheet of small, rapidly ascending gas bubbles that result in vigorous mixing at the cathode surface, and insures optimum deposition conditions. See column 6, lines 21-68.

19. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious at the time the invention was made to have provided the bubbling means for introducing oxygen of Heimann below the space between the anode and cathode so that the bubbles flow over the surface of the cathode as taught by Harvey because the electrolyte near the cathode would have been vigorously mixed.

20. With respect to claim 4, Harvey discloses that it is advantageous to introduce the gas as small bubbles. See, for example, column 6, lines 29 and 59. The limitation “fine” is interpreted as meaning “small”.

21. With respect to claim 5, as noted above, Harvey discloses supplying air so as to contact the surface of the cathode because it provides desirable mixing of the electrolyte at the cathode surface.

22. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harvey et al (US patent 3,928,152) in view of Sumiyoshi (US patent 4,934,307).

23. Harvey is interpreted and applied as above. Harvey additionally discloses that tubes 52 have a plurality of orifices which may have a size of 6 mils (152.4 μm). It is noted that the size of the openings in the tubes of Harvey falls within the range recited in instant claim 11. While Harvey discloses tubes with orifices, the tubes are not specifically described as “porous”. The Sumiyoshi patent is directed to a method and apparatus for coating flux onto circuit boards (abstract; column 1, lines 10-17). Air is introduced into the apparatus using porous tubes (abstract). The tubes are illustrated as element 8 in figures 1 and 2. The tubes generate uniform and microfine bubbles (column 5, lines 42-45). The tubes have an average pore diameter in the range of 10 to 30 μm and a porosity (void ratio) in the range of 35 to 55% (column 5, lines 47-55). It would have been obvious to have utilized a porous tube as disclosed by Sumiyoshi in the apparatus of Harvey because such a tube is capable of generating uniform bubbles.

24. With respect to claim 11, the values for pore diameter and porosity (void ratio) disclosed by Sumiyoshi fall within the ranges recited by applicant.

25. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harvey et al (US patent 3,928,152) in view of Sumiyoshi (US patent 4,934,307) as applied to claims 10 and 11 above, and further in view of Sherman (US patent 6,251,289).

26. Claim 12 additionally recites that the porous body is a sintered body of any metal powder, ceramic powder or organic powder. The Sherman patent is directed to the treatment of liquid with an oxidizing gas by introducing the oxidizing gas into the liquid as sub-micron size bubbles. See the title and figure 1. In one embodiment, sub-micron size bubbles were supplied to a quantity of wastewater containing organic contaminants. The sub-micron size of the bubbles of the oxidizing gas greatly increased the surface area of the gas and increased the efficiency of the reaction (column 3, lines 32-42). The sub-micron sized bubbles are formed by passing the oxidizing gas through a tube which may be made of sintered stainless steel or sintered ceramic. It would have been obvious to have formed porous tubes for use in the apparatus of Harvey by sintering a metal or ceramic powder as taught by Sherman because such tubes are capable of effectively generating sub-micron sized bubbles.

27. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harvey et al (US patent 3,928,152) in view of Sumiyoshi (US patent 4,934,307) as applied to claims 10 and 11 above, and further in view of John (US patent 4,419,650).

28. Claim 13 additionally recites that the porous body is a foamed product. The John patent is directed to apparatus in which a porous metal tube is utilized. The porous tube may be made of foamed metal (column 17, lines 36-45). It would have been obvious to have utilized a foamed

tube as the tubes in the apparatus of Harvey as disclosed by John because such foamed tubes are porous and would be capable of generating bubbles as required by Harvey.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM LEADER whose telephone number is (571)272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa D. Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William Leader/
September 23, 2011

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1723